

TORREYA

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BOTANICAL
GARDENOBSERVATIONS ON THE FLORA OF THE ISLE OF
PALMS, CHARLESTON, S. C.

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There has been little done in recent years toward the classification of the coast flora of South Carolina into its component parts, or toward determining the northern limit of a number of subtropical species that reach our shores. Several of our southern states have been or are now being investigated in a rather thorough manner, and it is to be hoped that the useful work of the neighboring states will be extended into South Carolina. Lloyd and Tracy have published on the insular flora of Mississippi and Louisiana; in Alabama, Mohr has completed a valuable botanical survey of the state; and in Georgia, Harper is now working along similar lines. Kearney has published two important papers on the littoral flora of North Carolina, and Johnson has published notes on the flora of Beaufort, N. C. To the northward this work has been extended into New Jersey and Delaware by Harshberger and by Snow. There is little to be found on the littoral flora of Florida except a few notes by Dr. H. J. Webber in *Science*, 1898.

In the hope of adding a little to our knowledge of the distribution of the South Carolina coast flora I took the opportunity while on the way to Florida in 1903 to stop a few days in Charleston and make a survey of the western end of the Isle of Palms. Not until recent years has this island been easily accessible and I know of no botanists who have visited it except representatives of the U. S. Department of Agriculture who collected grasses there a few years ago. The Isle of Palms is in shape somewhat like a ham, with the large end eastward and the west end tapering to a rounded point, which is separated from Sullivan's Island by a narrow channel. The island faces the open ocean

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to the south and is separated from the mainland by wide marshes dotted with a few small islands. The Isle of Palms is about four and one-half miles long and one mile across at the broadest part. The time at my disposal being limited, I did not attempt to study the entire island, but confined myself to the western half. Within this small area, however, there is as great a diversity of ecological conditions as is generally found over a much more extended region. From the few struggling and half-buried halophytes of the beach one may pass over the outer dunes with their grasses and the inner dunes with their palms, then across a narrow marshy strip and into a dense forest of oaks and pines, with trees over forty feet in height — and all within a distance of three hundred yards.

It will probably be best to begin by describing the vegetation as it appears in passing from the shore on the south side to the marshes on the north.

The Upper Beach. — Just above ordinary high tide there is an area of varying width where the sand remains constantly damp and is occasionally flooded by very high water. At places along this narrow strip of damp sand there was coming up an immense quantity of seedling sea-oats (*Uniola paniculata*), which was preparing to hold the sand together for a new line of dunes. Although I have observed shores fringed with sea-oats at various places in North Carolina, South Carolina and the Bahama Islands, this is the first time that I have ever noticed the *Uniola* seeding itself in any quantity. Besides the *Uniola* there was very little else to be found in this strip except an occasional specimen of *Salsola Kali*, *Croton punctatus*, *Atriplex arenaria* and *Amaranthus pumilus*. This is as far south as this interesting species of *Amaranthus* is known to occur.

The Dunes. — Beginning with the low ridges just back of the upper beach, the dunes rise gradually by broken and irregular ridges and knolls until they terminate abruptly in an elevated ridge, sometimes twenty or more feet above sea-level, which is slowly advancing in places to cover and destroy the dense growth in the marshy strip behind it. The tops of the low outer dunes are held by several sand-binding grasses, each of which seems to

dominate particular elevations. *Uniola*, which is most abundant, covers many of the ridges, *Sporobolus virginicus* has possession of others, and *Panicum amarum* and *Spartina polystachya* occur in considerable quantity. Kearney has called attention to a fact just mentioned — that each species seems to have complete control over certain areas and a mixture of several is rarely seen. Excluding the grasses, the vegetation is very scanty. *Croton maritimus*, *Iva imbricata* and *Salsola Kali* are the only species that seem capable of existing here. The *Iva* and the *Salsola* are extremely succulent, the *Croton* less so, but well protected by shining scales. In the depressions behind the outermost dunes, where moisture prevents the sand from being easily disturbed, several other plants appear in addition to the ones just mentioned. *Euphorbia polygonifolia* and *Oenothera humifusa* are not rare in such positions, and the troublesome grass *Cenchrus tribuloides* is abundant. *Leptochloa fascicularis*, a grass that is rather common here, assumes among these outer dunes a very different form from the specimens in more stable soil. Its branches are here long and straggling and of a reddish color, while on the landward side of the island it is much more delicate and turf-like. At certain places the tide makes in between the outer ridges and floods the depressions behind them. On the borders of one of these flooded depressions I was delighted to find a beautiful growth of the trailing tropical sand-strand plant *Ipomoea littoralis* (L.) Boiss., which takes the place here which is generally occupied farther south by the much more common *Ipomoea Pes-Caprae*. In Fig. 1 is given a photograph of this spot with *Ipomoea littoralis* in the foreground. It will be noticed that the tips of some of the long runners are submerged at high tide. As far as I can determine, this is as far north as this plant has been recorded on our shores. The other plants represented in the photograph are *Spartina polystachya*, covering a little knoll in the middle to the left. *Uniola paniculata* in center and left of background, *Panicum amarum* in background to right, and a few clumps of *Salsola Kali* in center to right.

In the somewhat sheltered depressions among the dunes there are also present a few scattered specimens of *Yucca gloriosa*.

About two-thirds of the way back to the inner ridge the tropical palmetto (*Inodes Palmetto*) suddenly appears in abundance and extends backward over the inner dunes (avoiding only the unstable crest where they terminate) into the fresh marsh and the woods behind. The long irregular line of luxuriant palmettoes capping the dunes presents a most attractive picture and gives to this island a clear title to its name. Among the palmettoes



FIG. 1. Strand- and sand-dune vegetation, Isle of Palms, S. C. See page 137.

occur large clusters of the familiar poke-berry (*Phytolacca decandra*). The capacity of this weed to flourish in such unfavorable situations was a surprise to me, and I have not seen it mentioned as a strand plant by others. Scattered here and there on the almost bare sand are clumps of *Salsola Kali* with its succulent spiny leaves and an occasional specimen of *Yucca aloifolia*. Here also was found a little *Physalis pubescens* and the very interesting *Polygonum maritimum*, which in habit and appearance scarcely recalls the other species of the genus. Of the four sand-binding grasses mentioned as prominent on the outer ridges, only *Uniola* extends backward among the palms, but *Cenchrus tribuloides* is everywhere present in dry soil except on the most unstable sand. In certain places the inner ridge was lower and more broken and

in such spots the live oak, *Quercus virginiana*, forms low and contorted thickets, over which twines the yellow jessamine (*Gelsemium sempervirens*).

A photograph of the dunes taken from their inmost edge is given in Fig. 2. In the center of the photograph, between the palmettoes is a large clump of *Phytolacca decandra*; sea-oats (*Uniola*) occupy the ridges in background; in foreground is *Cenchrus tribuloides*. In foreground to left is shown half of a plant of *Salsola Kali*.

As mentioned above, the dunes terminate at this part of the island in a high unstable ridge which is in places being constantly



FIG. 2. Sand-dunes from inmost edge, Isle of Palms, S. C. See text above.

extended landward by the pouring of sand down its inner slope. The inward advance of the dunes, however, has not been sufficient, so far, to cover to any extent the forest behind and produce the "graveyards" of trees that are so conspicuous at some places along our coast.

Even where the sand is in motion, a number of vines nearly always succeed in gaining a position on the incline, and though constantly covered by the moving sands their tips as constantly emerge and continue their growth. The vines that most successfully contended with this shifting sand were *Ampelopsis ar-*

borca (*Cissus bipinnata*), the Virginia creeper (*Parthenocissus quinquefolia*), the poison ivy (*Rhus radicans*) and the wild muscadine (*Vitis rotundifolia*). These would frequently succeed in stopping the sand march, and would then cover its dune slope with a dense mat of green. Other vines also took a part in this struggle: may-pop (*Passiflora incarnata*) with its fine purple flowers and yellow fruits, and *Smilax Bona-nox* were common. In situations where the dune slope had become fixed by vegetation, a number of trees, shrubs and herbs were well established. The live oak (*Quercus virginiana*), red bay (*Persea Borbonia*), and red mulberry (*Morus rubra*) often attained the proportions of trees, and almost reached the top of the dunes. The following shrubs often formed dense clumps in such places: French mulberry (*Callicarpa americana*) with handsome purplish fruits, *Myrica carolinensis* and *Ilex vomitoria*. In Fig. 3 is shown the



FIG. 3. Ridge of sand-dunes with swamp and forest behind, Isle of Palms, S. C. See text below.

ridge of the dunes with the marshy strip and forest behind. To the left a palmetto is being covered by the sand. The vines climbing up the slope around the palmetto are *Ampelopsis arborca*, *Parthenocissus quinquefolia* and *Passiflora incarnata*. The large live oak to the left with its top sheared by the wind is being

slowly killed. The two dead oaks in center were probably killed by an increase in the amount of moisture in the soil. In foreground to right is shown the low vegetation of the marshy strip.

In addition to the trees mentioned above as occurring on the inward faces of the dunes, others may be found in the best protected situations. These are *Quercus laurifolia* (laurel oak), *Salix fluviatilis* and *Juniperus virginiana*. The only fern discoverable here was the ubiquitous *Pteridium aquilinum*.

As the narrow western end of the island is approached the dunes become sharper and higher, the palms disappear, and the forest gradually runs out into a lower hammock growth, disappearing about one mile from the point. The inner faces of these higher dunes are covered with *Uniola*, among which *Strophostyles helvola*, the beach bean, is so abundant as almost to hide the sand. Among these two dominating species there is a good deal of *Croton punctatus* and *Passiflora incarnata*. Behind the dunes at this point there is a long depression, in places slightly marshy, which is covered with a dense mixed coppice of shrubs about ten feet high. The most abundant species here is *Myrica carolinensis*, but with it are red bay (*Persea Borbonia*), cedar (*Juniperus virginiana*), red mulberry (*Morus rubra*) and live oak (*Quercus virginiana*). In places *Smilax Beyrichii* and *Ampelopsis arborea* (*Cissus bipinnata*) form a dense canopy over the shrubs. On the bare ground beneath a good quantity of *Agaricus campestris* was growing. On the edges of the coppice grew *Callicarpa americana*, *Baccharis halimifolia*, *Solanum nigrum*, *Monarda punctata*, *Rubus trivialis* and *Ascyrum stans*.

The Fresh Marsh.—Returning to that part of the island further to the east, represented in Fig. 3, we find behind the inner faces of the dunes a low narrow marshy area in some places covered with several inches of water, in others barely wet. The principal trees of this marshy strip are the old field pine (*Pinus Taeda*), the palmetto, and in places that are only damp, the live oak. The palmetto can grow in quite wet soil and is frequently seen in standing water. *Cornus stricta* and *Baccharis halimifolia* are the principal marsh shrubs, but in places that are not too wet *Myrica carolinensis* also occurs. The following vines are luxuriant here

and cover the trunks of most of the trees: *Ampelopsis arborea*, *Parthenocissus quinquefolia* and *Gelsemium sempervirens*. *Berchemia scandens* is rare. In the shallow water grows *Hydrocotyle ranunculoides*, and on the damp borders are *Lippia nodiflora*, *Diodia virginiana*, *Micranthemum orbiculatum*, *Ludwigia virgata* and *Rubus trivialis*. The fern *Dryopteris Thelypteris* is found in considerable quantity in shallow water. Other herbaceous plants in this area were *Boehmeria scabra*, *Lactuca clongata*, *Polygonum setaceum* and *Bidens frondosa*. A species of *Lechea* was also plentiful. The beautiful malvaceous plant, *Kosteletzkya althaeifolia*, while not seen here, was found in a marshy place further inland.

The Forest.—In the forest which covers the whole interior of the island the trees are of vigorous growth, reaching a height of thirty to forty feet. The pines (*Pinus Taeda*) and oaks (*Quercus virginiana* and *Quercus laurifolia*) are the dominant forms, but a number of other species are more or less plentiful. Large specimens, 40 feet high, of *Juniperus virginiana* were seen, and the following, though not so large, reached the proportions of trees—*Persea Borbonia*, *Ilex opaca*, *Morus rubra*, *Osmanthus (Olea) americana*, *Celtis occidentalis*, *Prunus serotina*, *Bumelia tenax* and *Salix fluviatilis*. In sandy or damp places the palmetto forms a conspicuous part of the vegetation (Fig. 3). On the oaks the gray moss (*Tillandsia usneoides*) hung in long festoons, while mistletoe (*Phoradendron flavescens*) and the fern *Polypodium polypodioides* were not uncommon on the trees. The undergrowth was made up of the following shrubs, *Laurocerasus caroliniana*, *Callicarpa americana*, *Myrica carolinensis*, *Ilex vomitoria*, *Rhus copallina* and *Fagara Clava-Herculis*. In addition to these, *Osmanthus americana* and *Bumelia tenax*, already mentioned as trees, are more often found as shrubs in the undergrowth. The live oak, too, is frequently low and almost procumbent, forming a large part of the shrubby growth even under large trees of the same species. In the woods as well as near the dunes the woody vines are conspicuous. The yellow jessamine, the poison ivy and the Virginia creeper are abundant. *Berchemia scandens* was not so common. The principal herba-

ceous vines were *Willughbaeya scandens*, *Ipomoea speciosa* and *Galactia volubilis*. One specimen of *Vincetoxicum suberosum* was seen. Excluding the grasses the herbaceous undergrowth was very scarce. *Elephantopus carolinianus*, *Eupatorium leucolepis*, *Rubus trivialis*, *Galium hispidulum*, *Opuntia Opuntia* and *Ascyrum stans* were the only species noted. The most abundant grasses here were *Panicum lanuginosum*, *Eleusine indica*, *Sporobolus indicus*, *Uniola laxa* and *Paspalum altissimum*.

The Hammocks.—Just above the pavilion, which is about one and one-half miles from the western end, the forest narrows to a width of about 300 yards and assumes the character of hammocks. The trees become lower, more spreading, and less densely crowded. The dry sandy soil is often almost bare. A little shrubbery appears in scattered clumps, but grasses and vines

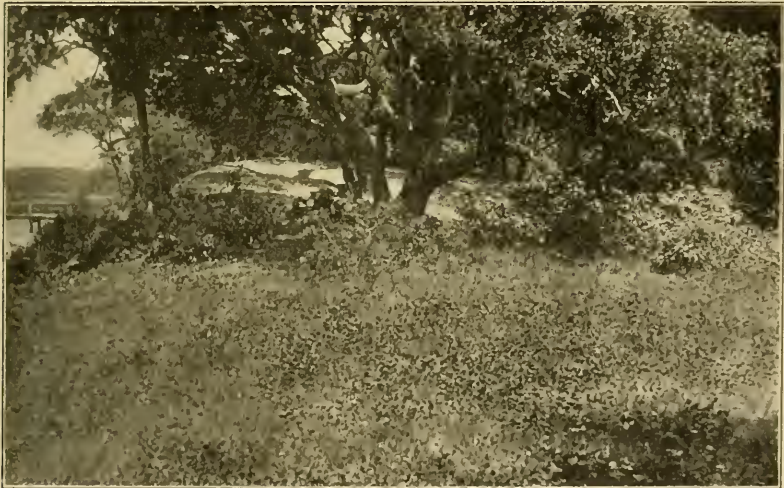


FIG. 4. Hammock vegetation, Isle of Palms, S. C. See page 144.

form most of the covering. The trees are principally live oak and laurel oak. Cedar, red bay and palmetto are occasional. The shrubbery is composed in great part of *Fagara Clava-Herculis* and *Ilex vomitoria*, with a little *Laurocerasus caroliniana*, *Bumelia tenax*, *Callicarpa americana* and *Myrica carolinensis*. *Yucca filamentosa*, *Opuntia Opuntia* and *Opuntia Pes-Corvi* appear

in the driest positions. The grasses are *Stenotaphrum americanum*, which is much used in Charleston as a lawn grass, *Cynodon Dactylon*, also a good lawn grass, *Leptochloa fascicularis*, *Sporobolus indicus* and *Panicum lanuginosum*. *Strophostyles helvola* and *Galactia volubilis* are the principal vines. The herbs noted were *Monarda punctata*, *Eupatorium leucolepis*, *Galium hispidulum*, *Bidens frondosa*, *Sanicula canadensis* and species of *Meibomia*. In Fig. 4 is shown a part of this hammock growth. In center is a live oak, with a cedar to left. The shrubs are *Callicarpa* to right, *Fagara Clava-Herculis* in front of oak, and *Myrica carolinensis* to left. In foreground is the grass *Leptochloa fascicularis*, through which is running the vine *Strophostyles helvola*.

The Salt Flats and Marshes.—On the north side of the island the character of the shore varies considerably. Towards the western end there is a low sandy plain just above high-tide mark which is covered with an association of *Iva frutescens*, *Borrichia frutescens* and several species of sedge. A few scattered clumps of *Myrica* project above the general level, and the pretty little *Sabbatia stellaris* adds dashes of color at intervals. Just beyond this sandy plain and separated abruptly from it by a line of drift is a low flat of sandy mud covered at high tide by a few inches of water. This flat is covered with a dense and beautifully level growth of *Borrichia frutescens* and *Sporobolus virginicus* in almost pure association. The *Borrichia* stood about one foot high, the *Sporobolus* about six inches. Among these was a little *Salicornia ambigua* and *Aster subulatus*. This growth ends abruptly and is followed by a dense strip of pure *Salicornia ambigua* about twenty feet wide. Adjoining this, in the black wet mud, commences the extensive marsh-grass (*Spartina patens*) flats which stretch across to the mainland.

Toward the east, the *Borrichia-Sporobolus* flat just mentioned ends rather abruptly in a slightly lower and more muddy area, when the growth changes quickly to an inner strip of *Spartina polystachya* and an outer strip of *Sporobolus virginicus*, both of quite pure growth. At one point on the back beach was noticed a fine lot of *Sesuvium Portulacastrum*.

Around a little garden back of the pavilion were found the following weeds: *Acalypha gracilens*, *Acalypha ostryaefolia*, *Pyrrhopappus carolinianus*, *Sida rhombifolia*, *Amaranthus spinosus*, *Datura Stramonium* and *Physalis pubescens*.

Following is the list of grasses and sedges collected on the island. Most of them were indentified by Professor A. S. Hitchcock, to whom I wish to express my thanks.

<i>Cynodon Dactylon</i> (L.) Pers.	<i>Fimbristylis spadicea</i> (L.) Vahl
<i>Eleusine indica</i> (L.) Gaertn.	<i>Leptochloa fuscicularis</i> (Lam.)
<i>Spartina polystachya</i> (Michx.)	Gray
Ell.	<i>Distichlis spicata</i> (L.) Greene
<i>Panicum virgatum</i> L.	<i>Syntherisma filiforme</i> (L.) Nash
<i>Panicum lanuginosum</i> Ell.	<i>Paspalum altissimum</i> LeConte
<i>Panicum amarum</i> Ell.	<i>Uniola laxa</i> (L.) B. S. P.
<i>Panicum agrostoides</i> Spreng.	<i>Uniola paniculata</i> L.
<i>Scleria triglomerata</i> Michx.	<i>Cenchrus tribuloides</i> L.
<i>Stenotaphrum dimidiatum</i> (L.)	<i>Spartina patens</i> (Ait.) Muhl.
Brong.	<i>Cyperus pseudozegetus</i> Steud.
<i>Phleum pratense</i> L.	<i>Cyperus esculentus</i> L.
<i>Sporobolus indicus</i> (L.) R. Br.	<i>Cyperus Nuttallii</i> Eddy
<i>Sporobolus virginicus</i> L.	

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SHORTER NOTES

NAMES OF INSECTS. — It is continually observed, that when entomologists have occasion to refer to plants, they seem to think that "any old name" will do. For example, Dr. H. G. Dyar has in Proc. U. S. Nat. Museum, 1902, an article on larvae of moths found in Colorado. The entomological part of the article is admirable; but some of the references to the plants on which the caterpillars fed are extraordinary. The queerest error occurs on page 409, where *Onosmodium* is metamorphosed into *Pnosmodium*, and a new moth bred from it is actually named *Gracilaria pnosmodiella* by Mr. Busck! Opposed as I am to changing the form of names, I shall feel obliged to refer to this insect as *Gracilaria onosmodiella*. Having admitted the sins o